

Laser Diode and Temperature Controller – ITC500 Series

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ITC500 Combination LD and TEC Controller
 Laser Diode Current: $\pm 200\text{mA}$ or $\pm 1\text{A}$
 TEC Current: $\pm 2\text{A}/16\text{W}$ or $\pm 4\text{A}/32\text{W}$
 Optional IEEE-488 Interface

Highlights

- Combination Low-Noise Laser Diode/Temperature Controllers With Stability $<0.002^\circ\text{C}$
- Laser Currents: $\pm 200\text{mA}$ or $\pm 1\text{A}$
- TEC Current: $\pm 2\text{A}/16\text{W}$ or $\pm 4\text{A}/32\text{W}$
- Constant Current and Constant Power Mode
- CDRH US21 & CFR 1040.10 Compliant
- Analog Modulation Input
- Set Temperature Can be Protected Against Accidental Adjustment
- Temperature Window Protection With Automatic Laser Current Deactivation
- Independent P, I, and D Controls
- Optional IEEE-488.2 Interface, With 18-Bit High Resolution Mode
- LabVIEW™ and LabWindows™/CVI Drivers
- CSA Approved and CE Certified

Introduction

The ITC500 Series low-noise laser diode current and TEC controllers offer both current control and temperature control in one unit. These instruments provide a maximum laser drive current range of $\pm 200\text{mA}$ or $\pm 1\text{A}$, and a TEC drive current of up to $\pm 2\text{A}/16\text{W}$ or $\pm 4\text{A}/32\text{W}$. To ensure the excellent noise performance, the ITC500 controllers do not utilize a microprocessor; however, this series retains all the easy-to-use features that are typical of a microprocessor-based user interface.

CONTROLLER USE

Instrument Configuration

A fixed configuration can be set via an 8-pin DIP switch at the rear of the unit. The preset configuration, which can be changed via the front panel during operation, is activated automatically when the unit is turned on.

Monitor Photodiode Adjustments

The monitor photodiode can be operated with a reverse bias voltage to improve the frequency response; this may be required when modulating the laser at high frequencies. The gain of the constant power mode control loop can also be adjusted to accommodate different laser diodes.

Calibrating the Power Display

The photodiode can be calibrated by adjusting the front panel trim potentiometer marked "ADJ PD." This feature allows it to read out the laser power in milliwatts. Please note an optical power meter is required to properly calibrate the power.

External Modulation

The laser diode can be modulated in constant current or constant power mode via an analog modulation input "MOD IN" located on the front panel. The maximum modulation frequency of the laser diode is 500kHz for the ITC502 and 200kHz for the ITC510.

FEATURES

User-Friendly Interface

The front panel is divided into two major sections: the temperature control section on the left and the current source section on the right. These operate independently of each other to enable easy and intuitive use of the instrument.

Extremely Low Noise

The ITC500 exhibits exceptionally low current noise and temperature drift, making this instrument one of the best-performing combination controllers available.

Intuitive Display

Laser current, laser voltage, monitor current, optical power, current limit, and reverse bias voltage for the monitor diode can all be viewed on the 5-digit LED display located on the right side of the instrument. The second LED display, located on the left side, can show the set temperature, actual temperature, TEC current, TEC voltage, TEC current limit, and the set temperature window.

Built-In Laser Diode Protection

The ITC500 has many common protection features, such as electronic short circuit of the laser diode while the output is switched off, soft start, transient suppression in case of mains failure, a suitable mains filter, and shielding of the transformer. In addition, it offers interlock, laser and TEC current limit, over temperature protection, temperature window protection, open circuit detection, and no sensor detection.

OPTIONAL INTERFACE

IEEE-488.2 Interface

Each combination controller is offered with an optional IEEE-488.2 interface, which facilitates remote control and monitoring. The IEEE interface has the same functionality as the standard serial (RS-232) interface – an LED on the front panel indicates any communications or programming errors. The IEEE interface, however, offers enhanced speed and control capabilities, and can transfer data eight times faster. The RS-232 offers point-to-point control – one computer to one test instrument – but the IEEE interface allows up to 16 instruments to be integrated into one measurement and control system at the same time.

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Benchtop Drivers

Platform Drivers

OEM Drivers

Laser Diode Mounts

Laser Diodes

Pigttailed Lasers

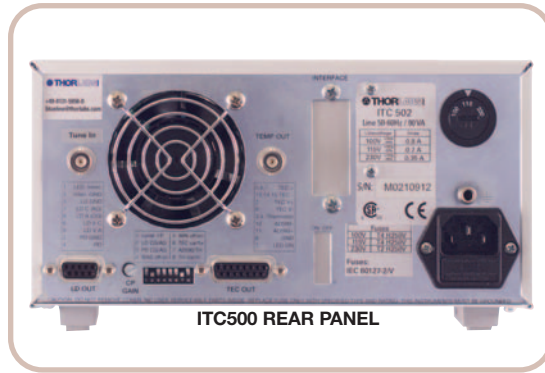
Laser Modules

Accessories

Laser Controller Specifications

	ITC502	ITC510
Laser Controller:		
Current Control		
Current Control Range	0 to ±200mA	0 to ±1A
Compliance Voltage		>6V
Setting Resolution (IEEE-488)	10µA (3µA)	100µA (15µA)
Measurement Resolution (IEEE-488)	10µA (1µA)	100µA (10µA)
Current Accuracy	±100µA	±1mA
Noise Without Ripple (10Hz to 10MHz, RMS, Typical)	<1.5µA	<5 µA
Ripple (50Hz, RMS, Typical)	<1.5µA	<3µA
Transients, Typical	<200µA	<1mA
Drift (24 hrs, @ Constant Amb. Temp, Typ.)	<10µA	<30µA
Temperature Coefficient	<50ppm/ °C	
Power Control		
Control Range of Photocurrent	5µA to 2mA	
Setting Resolution (IEEE-488)	0.1µA (0.03µA)	
Measurement Resolution (IEEE-488)	0.1µA (0.01µA)	
Accuracy (Typical)	±2µA	
Reverse Bias Voltage	0 to 10V	
Current Limit		
Setting Range	0 to 200mA	0 to 1A
Resolution	10µA	100µA
Accuracy	±0.5mA	±2.5mA
Laser Voltage Measurement		
Measurement Principle	4-Wire	
Measurement Range	0 to 10V	
Resolution	1mV	
Accuracy	±20mV	
Analog Modulation		
Input Impedance	10kΩ	
Modulation Coefficient CC	20mA/V ±5%	100mA/V ±5%
3dB-Bandwidth at CC ¹	0 to 500kHz	200kHz
Modulation Coefficient CP	0.2mA/V ±5%	
Control Output for Laser Current		
Output Impedance	10kΩ	
Transmission Coefficient	50V/A ±5%	10V/A ±5%

1) Small signal bandwidth. 2) All data valid at 23 ± 5°C and 45 ± 15% relative humidity .



Temperature Controller Specifications

	ITC502	ITC510
Temperature Controller:		
Control Range of TEC Current	0 to ±2A	0 to ±4A
Compliance Voltage		>8V
Maximum Output Power	16W	32W
Resolution of TEC Current (IEEE-488)	1mA (0.1mA)	
Accuracy of TEC Current	± 10mA	± 20mA
Resolution of TEC Voltage (IEEE-488)	1mV (0.1mV)	
Accuracy of TEC Voltage	±40mV	
Noise and Ripple Typical	<1mA	<2mA
Temperature Sensors:		
Thermistor		
Control Ranges	10Ω - 19.9kΩ / 100Ω - 199kΩ	
Resolution (IEEE-488)	1Ω (0.3Ω) / 10Ω (3Ω)	
Accuracy	±5Ω / ±50Ω	
Stability (24hrs)	≤0.5Ω / ≤5Ω	
IC Sensors AD590, AD592, or LM335		
Control Ranges ¹	-45°C to +145°C	
Resolution (IEEE-488)	0.01°C (0.003°C)	
Accuracy (Not LM335)	± 0.1°C	
Stability (24hrs)	<0.002°C	

1) Limited by rating of sensors.

ITC500 Series General Data

- **Protection Features:** Soft Start, Interlock, Short Circuit When Off, Laser Current Limit, Over Temperature Protection, TEC Current Limit, Temperature Window Protection, Open Circuit Detection, No Sensor Detection
- **Displayed Laser Parameters:** Laser Current, Monitor Current, Laser Current Limit, Output Power, Laser Voltage, Photodiode Bias Voltage
- **Operating Temperature:** 0 – 40 °C
- **Displayed TEC Parameters:** Actual Temperature, Set Temperature, TEC Current Limit, TEC Current, Temperature Window, TEC Voltage
- **IEEE-488.2 Interface:** 16-Bit Setting and 18-Bit Measurement Resolution
- **Dimensions (W x H x D):** 220 x 110 x 351mm
- **Line Voltage:** 100V, 115V, 230V +15%/-10% @ 50-60Hz

ITEM	\$	£	€	RMB	DESCRIPTION
ITC502	\$ 1,860.00	£ 1,171.80	€ 1,729.80	¥ 17,763.00	LD and TEC Controller, LD 200mA, TEC 16W
ITC502-IEEE	\$ 2,220.00	£ 1,398.60	€ 2,064.60	¥ 21,201.00	LD and TEC Controller, LD 200mA, TEC 16W, IEEE-488
ITC510	\$ 1,980.00	£ 1,247.40	€ 1,841.40	¥ 18,909.00	LD and TEC Controller, LD 1A, TEC 32W
ITC510-IEEE	\$ 2,340.00	£ 1,474.20	€ 2,176.20	¥ 22,347.00	LD and TEC Controller, LD 1A, TEC 32W, IEEE-488